HEADWATER DIVERSION CHANNEL WATERSHED INVENTORY AND ASSESSMENT

PREPARED BY
DENNIS E. NORMAN
Fisheries District Supervisor
Missouri Department of Conservation
Cape Girardeau
May 1994

EXECUTIVE SUMMARY

The Headwater Diversion Basin is the intercepted and diverted headwater drainage of the much larger Little River Basin. The four primary streams in the 1,207-square mile Headwater Diversion Basin are Castor River (6th order, 69 miles), Whitewater River (6th order, 56 miles) and Crooked Creek (5th order, 49 miles) which are now tributaries to the man-made Headwater Diversion Channel (7th order, 34 miles) that drains into the Mississippi River near Cape Girardeau, Missouri. The basin is primarily Ozarkian in nature with a steep descent into the Mississippi Lowlands and is characterized by a high incidence of permanent streams, diverse channel gradients and land use which is 55% woodland, 22% grassland and 19% cropland. Only 30,100 people live in the basin which is free of heavy industrial developments and major urban centers.

Stream ecology throughout most of the basin is particularly healthy and no obvious chronic threats to stream resources are apparent. This plan describes the current status and addresses opportunities for preserving or improving four major resource elements within the basin.

STREAM USE

The basin receives moderate fishing pressure and very limited amounts of other recreational activities. In 1977, an estimated 58,000 fishing trips ranked the basin in the 42nd percentile (15th out of 36) when fishing pressures in 36 Missouri basins were compared. Telephone survey estimates of 1987 and 1988 fishing trips averaged 33,000 trips per year. Telephone survey data indicate that fishing pressure within the basin is concentrated on the Diversion Channel, which receives 3 times as many trips and 7 times more angling hours per acre than Castor River.

Public access to 190 miles of floatable mainstem streams and 130 miles of wadable tributaries is generally good; but, some locations in the basin need more access. Currently, 15 public access areas, with over 10 miles of frontage and 5 boat ramps, are available for public use. Eight additional boat ramp sites and 8 larger frontage tracts are proposed for the basin in approved Missouri Department of Conservation (MDC) acquisition plans.

Recreational opportunities can best be enhanced by developing additional access facilities on the Diversion Channel to relieve current crowded conditions. Other sites should be developed upstream to encourage the dispersal of public use throughout more of the basin. Then, information directed at increasing public awareness of specific recreational opportunities, particularly those in the upper watersheds, should help encourage a more widespread and diversified public interest in the basin.

WATER QUALITY

An abundant water supply provided by adequate precipitation, good infiltration, high subsurface storage and minimal runoff assures clean, sustained and stable base flows which help maintain high water quality. Point source pollution is no longer considered a serious threat anywhere in the basin and nonpoint source pollution problems are generally moderate and local in nature.

Nutrient loading from livestock waste, non-permitted gravel mining, sawdust leachate and occasional raw sewage bypasses sometimes constitute minor threats to basin streams. These effluent problems can best be addressed by simply maintaining the current good water quality conditions at state standards and increasing public, industrial and political awareness of the conditions, causes and solutions to local runoff problems.

STREAM HABITATS

The quality and diversity of habitats throughout the basin are exceptional. The in stream habitat component is providing good elements of abundant cover, clean substrates and high base flows, which assures a stable water supply with adequate depths and flow during droughts. Most channels are well shaded and the basin is relatively free of problems related to turbidity, siltation and algal blooms. Channel alterations are usually associated with small gravel mining operations and occasional attempts by landowners to cutoff stream meanders. Movement of excessive gravel bedloads in the disturbed uplands, however, can disrupt channel hydraulics and smother good habitats.

Only 6% of the streambanks are severely or moderately eroding. The quality of the corridor vegetation is typically good with 75% of the existing corridors in dense timber. Corridor widths, however, are variable and agricultural encroachment into narrow corridors causes some streambank erosion problems.

Soils in the basin are highly erosive when disturbed. The potential for sheet, rill and gully erosion is the highest in the state; but, few fine sediments actually reach stream channels because of modest cropland acreage and fairly good farming practices. Coarse sediments, however, are eroding from the wooded uplands and clogging some downstream reaches because of poor timber harvest and woodland grazing practices.

Habitat problems are usually minor, scattered and most often associated with shifting gravel bedloads and streambank instability caused by a poor land-use practice. To maintain good habitats and make any needed habitat improvements, we will need to applaud and promote good forest and riparian stewardship by landowners through awareness, assistance and incentive programs. Unique habitats,

including those occupied by threatened and wetland species, must be protected from degradation through the acquisition of lands and easements or special Landowner Cooperative Project (LCP) efforts.

STREAM BIOTA

An assemblage of 113 fish species and 123 taxa of benthic macroinvertebrates, including 37 naiad species and 9 crayfish species have been identified. Threatened species include 10 rare, extirpated or watch list fishes and 5 rare or endangered naiads. A 36% increase in the total number of fish species since 1941 and the current abundant and widespread distribution of 29 intolerant fish species are indicators of good water quality and habitat conditions in the basin.

Similar patterns of size structure are generally shared by sport species throughout the basin. Recruitment of all sportfishes to stock-size is good and problems related to annual production or early mortalities are not apparent. Some species are recruiting to quality-, preferred- and memorable-sizes. Nearly one half of the channel and flathead catfish populations are quality- and preferred-sized fish. Common carp and freshwater drum are producing some memorable-sizes. Low recruitment of spotted bass to quality-size from proportionally high stock-size densities is a concern. Another concern is the low recruitment of preferred-size shadow bass from relatively high quality-size densities.

Species richness will be monitored and maintained at or above current basin levels by ensuring that stream and corridor habitats remain healthy and diverse through the promotion, acquisition and creation (wetlands) of needed habitat components. Size and density parameters associated with catfishes, crappies, shadow bass and spotted bass populations can be addressed through special fishing regulations if a creel survey suggests that angler harvest is significantly responsible for the parameters.

TABLE OF CONTENTS

WATERSHED LOCATION	LAND USE
GEOLOGY/GEOMORPHOLOGY	Historic Land Use
Physiographic Region	Current Land Use
Geology	Soil Conservation Projects
Soil Types	Public Areas
Watershed Area	Corps of Engineers 404 Jurisdiction
WATER QUALITY AND USE	HYDROLOGY
Beneficial Use Attainment	Precipitation
Water Quality	USGS Gaging Stations
Fish Kills and Contaminants	Streamflow Characteristics
Water Use	Dam and Hydropower Influences
Point Source Pollution	Stream Mileage, Order and Permanency
NonPoint Source Pollution	Channel Gradient

HABITAT CONDITIONS	BIOTIC COMMUNITY
Channel Alterations	Fish Community Data
Unique Habitat	Seine Data
Improvement Projects	Species Composition
Hawn Access	Relative Abundance
Zon Kuhlman LCP	Electrofishing Data
Marquand Access	Creel Survey Data
Old Plantation Access	State Listed Fish Species
Bollinger Mill State Park	Aquatic Invertebrates
MANAGEMENT PROBLEMS/ OPPORTUNITIES	Wetland Species
Aquatic Habitat Goal	Fish Introductions and Stockings
Fish Community Goal	Commercial Harvest
Recreational Goal	Other Management and Research Efforts
Water Quality Goal	Present Regulations
LITERATURE CITED	GLOSSARY
LIST OF TABLES	LIST OF FIGURES

LIST OF TABLES

- **Table 1.** Drainage area of major watersheds, Headwater Diversion Basin, Missouri. (Modified from: USDA. 1981. Watersheds in Missouri) The Hydrologic Unit Code 07140107- is the prefer to the USDA code.
- **Table 1-A.** Stream mileage summary, Headwater Diversion Basin, Missouri. (All profiled 3E and larger tributaries, tabulated by order, subbasin and hierarchal mile position from the headwaters of Castor River to the confluence with the Mississippi River).
- **Table 2.** Stream mileage summary, by order, subbasin and permanency, Headwater Diversion Basin, Missouri. (Measured directly from USGS 7.5 minute topographic maps).
- **Table2-A.** Channel gradient summary, Headwater Diversion Basin, Missouri. (All profiled 3E and larger tributaries, tabulated by order, subbasin and hierarchal mile position from the headwaters of the Castor River to the confluence with the Mississippi River).

- **Table 4.** Stream frontages on public areas in the Headwater Diversion Basin, Missouri. CA=MDC Conservation Area; AC=MDC Stream Access Area; SP=DNR State Park, USFS=United States Forest Service, MUNIP=Municipality; RM=River Mile on primary stream.
- **Table 6.** Base-flow (cfs) recession characteristics. Average rate of depletion of base flow during May through October drought periods, Headwater Diversion Basin, Missouri. From Skelton (1970)
- **Table 7.** Estimated magnitude and frequency of annual low flows, Headwater Diversion Basin, Missouri. (Modified from MDNR (1984)
- **Table 9.** Stream resources, by watershed, that would be flooded by a proposed 7,680-acre Cape Girardeau/Bollinger County recreational lake. (conservation pool at 480 NGVD)
- **Table 14.** Species list of all fishes collected in the Headwaters Diversion Basin by MDC personnel (X), University studies (U) and recognized private collectors (P). State threatened species status is indicated.
- **Table 15.** Species distribution, occurrence and composition in the Headwaters Diversion Basin, Missouri. From a total of 85 seine sites (% OCURR) of which 35 samples were enumerated (% COMP) by Pflieger and McCord.
- **Table 17.** Fish species capture from electrofishing sites by Fisheries Management District 11 staff, 1973 through 1990.
- **Table 20.** Castor River 6-year summary of selected creel parameters reported in the Missouri State-Wide Angler Survey, 1983 1988. Because of limited angler contacts (221 anglers during the 6-year period) all data were combined. Parameters involving estimates (pressure, total catch and total harvest) were avoided.
- **Table 21.** Headwaters Diversion Channel 2-year summary of selected creel parameters reported in the Missouri State-Wide Angler Survey, 1987-1988. Because of wide annual fluctuations and limited angler contacts (182 anglers during the 2-year period) all data were combined. Parameters involving estimates (pressure, total catch, and total harvest) were avoided.
- **Table 22.** State rank and location of species of conservation concern from the Headwaters Diversion Channel.
- **Table 23.** Species list and status (state and federal) of naiades collected in the Headwater Diversion Basin, Missouri. From the MDC Natural Heritage data base.

- **Table 24.** Species list and relative abundance of crayfish species collected in the Headwater Diversion Basin, Missouri. (From MDC NaturalHeritage data base)
- **Table 25.** Relative abundance of taxonomic classes of benthos collected in the Headwater Diversion Basin, Missouri. (From MDC Natural Heritage data base)
- **Table 26.** Fishes, naiades and crayfishes, collected in the Headwater Diversion Basin, that tend to inhabit wetlands during part of their life cycle. (MDC 1993c)

LIST OF FIGURES

- Figure 1. Location of Headwater Diversion Basin.
- **Figure 2.** Monthly maximum (20% chance), minimum (20% chance), and average precipitation at Marble Hill, Missouri for the period of record (1951-1980).
- **Figure 3.** Monthly maximum, minimum, and average stream flow at the Castor River Zalma gage station for the period of record (1920-1990).
- **Figure 4.** Flow duration curve, Castor River at the Zalma gage, 1922 through 1992, Headwater Diversion basin, Missouri.
- **Figure ge.** Geology within the Headwater Diversion watershed, Missouri.
- **Figure nd.** Location of the Headwater Diversion watershed within the Natural Divisions of Missouri.
- **Figure lu.** Land use/land cover within the Headwater Diversion watershed, Missouri (MORAP 1999, preliminary data).
- **Figure pa.** Public areas in the Headwater Diversion Watershed, in Missouri.
- **Figure gs.** Gaging staions in the Headwater Diversion Watershed, in Missouri.
- **Figure hb.** Habitat sampling locations in the Headwater Diversion Watershed, in Missouri.
- **Figure fs.** Fish sampling locations in the Headwater Diversion Watershed, in Missouri.
- **Figure ps.** Point source pollution sites in the Headwater Diversion Watershed, in Missouri.